

## APPENDIX A: RECEIVER SPECIFICATIONS SUMMARY

This appendix summarizes the noise measurement receiver component and system specifications.

### A.1 Receiver Description

**Design:** Single Conversion Superheterodyne

**Detection:** Log video

**Radio frequency range:** 136 - 138 MHz

**Intermediate frequency:** 10.7 MHz

**Local oscillator range:** 125.3- 127.3 MHz

**Image frequency range:** 114.6 to 116.6 MHz

**Predetection 3-dB bandwidth:** 32 kHz

### A.2 Component Specifications

The acronyms in front of each component specification are used in Figure 2.2.

ANT, antenna: quarter-wave monopole mounted on center of van roof mounted ground plan 3.6 m long and 1.6 m wide

F1, bandpass filter: 3-pole Chebychev, 0.1-dB ripple, 4.1 MHz 3-dB bandwidth, 0.3-dB loss

A1, amplifier: 37-dB gain, 8-dBm 1-dB compression point, 1.1-dB NF

F2, bandpass filter: 5-pole Chebychev, 0.1-dB ripple, 4.1 MHz 3-dB bandwidth, 1.7-dB loss

M, mixer: 8-dB conversion loss, 14 dBm (input) 1-dB compression point

LO, Hewlet Packard HP8662 frequency synthesizer: +15 dBm output power

P1, attenuator: 10 dB

F3, low pass filter: 70 MHz 3-dB cutoff frequency, 0.0- dB loss

A2, amplifier: 22-dB gain, 9 dBm 1-dB compression point, 5.3 dB noise figure

P2, attenuator: 10 dB

F4, bandpass filter: 3-pole Chebychev, 0.1-dB ripple, 214 kHz 3-dB bandwidth, 9.5-dB loss

A3, amplifier: 28-dB gain, 18 dBm 1-dB compression point, 7-dB noise figure

P3, attenuator: 6 dB

A4, amplifier: 34-dB gain, 21 dBm 1-dB compression point, 5-dB noise figure

P4, attenuator: 10 dB

F5, bandpass filter: 6-pole Chebychev, 1.0-dB ripple, 32 kHz 3-dB bandwidth, -1.8 dB loss

LA, log amplifier: 0.1 to 2.1 V, -80 to 0 dBm

ADC, digitizer: 0-10 V, 12 bit, 2.44 mV/ADC unit

### A.3 System Specification

All system power specifications are the power at the receiver input.

**Gain** (measured from receiver input to log amplifier input): 63.0 dB

**Noise figure:** 2.9 dB

**Predetection noise equivalent bandwidth:** 34.2 kHz

**Average noise power:** -126 dBm in 34.2 kHz bandwidth, -171 dBm in 1 Hz bandwidth

**1-dB compression point:** -50 dBm

**Two-tone test:** 136.999 (f1) at -66 dBm combined with 137.001 (f2) at -66 dBm, -63 dBm combined input power, third order output (2f1-f2, 2f2-f1): 136.997 and 137.003 are 42 dB down, fifth order output (3f1-2f2, 3f2-2f1): 136.995 and 137.005 are 65 dB down

**Log amplifier dynamic range** (0.1 to 2.1 V): -143 dBm to -63 dBm in 34.2 kHz bandwidth, -188 dBm to -108 dBm in 1 Hz bandwidth

**Image frequency rejection:** > 100 dB